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(54) **Friction open-end spinning method and apparatus.**

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US-A-3 881 132
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The DREF Spinning System of Yarns of Medium
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Description

This invention relates to apparatus for the open-end spinning of yarn and particularly to apparatus of the kind known as friction spinning.

Apparatus of this kind is disclosed in our published GB-A-2 042 599 and comprises two bodies of rotation each defining a surface and arranged such that the surfaces are closely adjacent at a line of closest approach so as to define between them at that line a yarn formation area, a fibre feed duct for feeding fibres into the yarn formation area which feed duct terminates closely adjacent the surfaces, means for rotating each of the bodies about a respective axis so as to twist the fibres in the area into a yarn, and means for withdrawing the yarn from the area.

Similar apparatus has been disclosed in various patents and patent applications by Barmag Barmer Maschinenfabrik AG. Dr. Ernst Fehrer and Vyzkumny Ustav Bavlarsky. None of these apparatus has yet reached fully successful commercial exploitation. Neither Barmag nor Fehrer have concerned themselves with the problems of fibres remaining in the yarn formation area at an end break, possibly because they have not in their apparatus had the small tolerances and gaps necessary in this area to achieve optimum spinning performance and to reduce air losses. Vyzkumny in their U.S. Patent 4 168 601 disclose an arrangement which also does not have the necessary small gaps and tolerances; but in this arrangement an inner cylindrical roller can be moved axially away from cooperation with the inner surface of an outer roller to allow cleaning of any material remaining in the spinning area at a stoppage and to perform the piecing up function. In this apparatus the spinning area is very large in comparison with the diameter of a yarn and hence there is no need for consideration of problems concerning excess material in that area during operation. The provisions for cleaning this form of apparatus would therefore be adequate to allow proper cleaning of the area although the structure is extremely cumbersome and therefore time consuming and also expensive to manufacture. It is also necessary to stop the motion of the surface.

In our published GB-A-2 042 599 (particularly in Figure 2) it is disclosed that one of the bodies can be moved away from the other and from the fibre feed duct, but this is only for purposes of adjustment of the small gaps between these parts for optimisation of the spinning conditions. Careful setting of the gap is necessary for any movement of the movable body in view of the very small tolerances necessary and when set the bodies and the feed duct are for all other purposes fixed.

It is an intention of the present invention to provide an open-end spinning apparatus of this kind wherein cleaning of any remaining fibres following a yarn break from the spinning area can be effected simply, quickly and without undue

mechanical complication and wherein any excess fibre material collecting in the spinning area does not cause damage. It is also an intention to provide methods of cleaning, following an end break, open-end spinning apparatus of this kind, which are simple, quick and effective.

Accordingly the present invention provides apparatus for open-end spinning of yarn, comprising first and second bodies of rotation each defining a surface and arranged such that in an operating position the surfaces are closely adjacent at a line of closest approach so as to define between them at that line a yarn formation area; a fibre feed duct for feeding an airborne stream of fibres into the yarn formation area which feed duct terminates in the operating position closely adjacent the surfaces; means mounting at least one of the first and second bodies and the feed duct such that at least one of the first and second bodies is movable relative to the other(s) away from and back to the operating position in a direction generally parallel to the plane including the said line of closest approach and the direction of movement of the fibres along the feed duct; and means for stopping the feed of fibres; characterised by the fact that the mounting of said at least one of the first and second bodies includes a pivot at or adjacent one end of the body for relative pivoting movement away from the operating position about a pivot axis transverse to the line of closest approach to increase the spacing of said at least one of the first and second bodies from the other(s) of the first and second bodies and the feed duct, and the movement back to the operating position decreases the spacing; and in that stop means are provided for defining the operating position such that the return to the operating position is made without the need for resetting the said spacing.

Additionally the invention provides a method of cleaning following a yarn break in an apparatus for open-end spinning of yarn of the type comprising first and second bodies of rotation each defining a surface and arranged such that in an operating position the surfaces are closely adjacent at a line of closest approach so as to define between them at that line a yarn formation area, suction means for developing an airstream through at least one of the surfaces of the yarn formation area, and a fibre feed duct for feeding fibres into the yarn formation area which feed duct terminates in the operating position closely adjacent the surfaces, the method including the steps of temporarily halting the airstream through the surface and of causing movement between at least one of the first and second bodies relative to the other(s) of the first and second bodies and the feed duct in a direction parallel to the plane which includes the line of closest approach and the direction of fibre feed, characterised in that said relative movement is pivotal movement about an axis which is transverse to the line of closest approach and at or adjacent one end of the pivotally mounted said

body so as to increase the spacing of the at least one of the first and second bodies relative to the other(s) of the first and second bodies and the feed duct.

The invention will become more apparent from the following description of one embodiment thereof when taken in conjunction with the accompanying drawings in which:

Figure 1 is a cross-sectional view (along the line I-I in Figure 2) showing schematically the rollers and feed duct of a friction spinning apparatus according to the invention;

Figure 2 is a cross-sectional view along the line II-II of Figure 1 omitting the feed duct and mounting arrangements for the roller 2;

Figure 3 is a view of the left hand end of Figure 2;

Figure 4 is a cross-sectional view similar to Figure 2 along the lines IV-IV of Figure 1; and

Figure 5 is straightened out view of the slot 25 in the inner sleeve 24 of Figures 1 and 4.

Reference should be made to our published British Patent Application No. 2 042 599 which discloses the structure and function of apparatus of this kind and the present description will for the most part concern those areas where the apparatus has been modified in accordance with the present invention.

The apparatus comprises a pair of cylindrical rollers 1 and 2 rotating in the direction shown by the arrows and arranged closely adjacent at a line of closest approach. The roller 1 is imperforate and comprises a solid metal roller. The roller 2 is perforated over the majority of its peripheral surface and has a duct 6 closely adjacent the inside surface with an elongate slot 7 which extends substantially fully along the roller 1 at or adjacent the line of closest approach.

Turning briefly to Figure 4, the mounting and bearing arrangements are substantially as shown and fully described in our published application, as is the duct 6 (shown at 13 in the published application). A further duct 22 communicates suction from a suction source not shown with the duct 6 and terminates at an end collar 23 adjacent the perforated portion of the roller 1. An inner sleeve 24 coaxial with the roller 2 and duct 6 is arranged to have its peripheral surface closely adjacent the inner surface of the duct 6 to prevent leakages of air and has a slot 25 having the shape of a parallelogram as shown in Figure 5, the purpose of which will be explained hereinafter. The sleeve 24 terminates at one end in a collar 26, for cooperation with the collar 23 to allow rotation of the sleeve 24 but to prevent axial movement, and at the other end in a shaft 27 which extends through a bore in the end of the duct 6 and which carries a manually operable lever 28 whereby the sleeve 24 can be rotated inside the duct 6.

A feed duct 8 is fixedly mounted on a portion of machine frame-work 9 shown only schematically;

the details of the feed duct are more fully described in our co-pending application No. 80. 32 417. It suffices to say here that the gaps between the rollers and between the rollers and the feed duct are kept small and the feed duct projects well in between the rollers toward the line of closest approach so that a small confined zone or yarn formation area is formed.

In this area fibres are fed from the feed duct and are twisted into yarn by the rotating of the rollers as disclosed in detail in our published application.

The roller 2 is mounted via the suction duct 6 on a machine frame member 10 substantially as shown in Figure 1 of our published GB-A-2 042 599 such that it is rigidly supported by the member 10 which in turn is rigidly connected to the frame member 9. Thus the feed duct 8 and roller 2 are fixed in relation to one another.

The roller 1 is mounted on a shaft 11 carried in bearings 12, 13 in turn supported in metal support plates 14, 15 such that the roller 1 is free to rotate in the plates 14, 15 but is rigidly supported thereby. The shaft carries a drive pulley 16 co-operating with a belt 17 which drives the roller and also drives the roller 2 by means not shown.

The plate 15 is a close fit within an opening cut in the frame member 10 and is carried on a pivot 18 rigidly fixed thereto. The plate 14 is similarly a close sliding fit within an opening in a further frame member 19 so that when in position in the frame member 19 it locates the roller 1 accurately relative to the feed duct 8 and the roller 2, in accordance with settings applied previously or during manufacture. A leaf spring 20 fixed to the frame member 19 by a screw 21 applies spring bias to the plate 14 so as to tend to maintain it in its position in the frame member 19. The spring is designed to apply only sufficient force to counteract the turning moment generated by pressure from the belt 17.

In use, under normal spinning conditions, the plate 14 remains in position in the frame member 19 and hence the settings between the rollers 1 and 2 and the feed duct 8 are maintained. However on an end break or any other fault occurring whereby an excessive amount of fibres enters the confined space defining the yarn formation area, the pressure developed by the excess fibres, tends to lift the roller 1 away from the feed duct by pivoting movement about the pivot 18 thus avoiding excessive force on the rollers and feed duct and possible resultant damage.

The axis of the pivot 18 lies in a plane parallel to one containing the axes of the rollers 1 and 2 and hence movement of the roller 1 is perpendicular to that plane.

It will be noted that the roller 2 tends to move any excess material away from the feed duct whereas the roller 1 tends to move it into the narrow gap between the feed duct and the roller. Hence movement only of the roller 1 is sufficient to prevent excess material causing damage. Additionally movement only of the roller 1 is

more simply achieved because it does not have the complexity of mounting and suction connections necessary for the roller 2 (as shown in Figure 4). However in an alternative arrangement motion of both of the rollers in this direction could be provided preferably by a pivoting arrangement.

Following the end break or fault it will be necessary to restart spinning and this necessitates cleaning of the yarn formation area to remove any remaining material. In practice after an end break a highly twisted mass of fibres is left along the spinning zone. This can be achieved simply and quickly and without disconnecting the drives to the rollers by the operative firstly moving the end of the roller 1 and the plate 14 upwardly against the spring bias on the pivot 18.

Secondly the lever 28 is manually turned anticlockwise to rotate the inner sleeve 24 in the same direction. This causes the lower surface of the slot 25 to move upwardly to gradually close off the slot 7 from the end at the back of the unit adjacent the drive belt 17 forwardly to the front end of the slot so that the remaining elongate mass of fibres is drawn forwards by the remaining airflow through the open part of the slot along the slot and eventually ejected from the spinning area after the slot is fully closed. In practice, the mass falls from the spinning area through the space left between the feed duct 8 and the roller 1 after it has been lifted and can be caught beneath the spinning unit on a catch-tray (not shown) for later cleaning. The closing off of the slot 7 is carried out gradually from the back to carry the fibre mass away from the influence of the suction applied to the feed duct (not shown in these drawings but disclosed in our published application) and to assist in causing one end to fall from the feed duct thus releasing the whole of the mass. It is however possible in other embodiments merely to close off the length of the slot 7 simultaneously, preferably in a direction away from the feed duct 8, whereby the mass is ejected mainly by the effect of the ongoing rotation of the roller 2.

On release of the roller 1 and plate 14 by the operative it will return to its proper position guided by the sliding of the plate 14 in the frame member 19. In this way the plate 14 and frame member 19 define the return position for the roller 1 and the settings of the rollers and feed duct are maintained without need for further adjustment or resetting, until replacement of a roller is necessary. The lever 27 is finally returned to the initial position to reopen the slot 7 and recommence the airstream through the surface.

For a yarn piecing cycle substantially as disclosed in our European Application No. 0 034 427 (to be published on 26th August 1981), the lever 28 can be moved also in a clockwise direction so that the upper surface of the slot 25 acts to close off the slot 7 from the front toward the back.

The invention can be applied also to apparatus

including two perforated rollers by closing off the suction jointly at a point further upstream and by moving one or both of the rollers relative to the feed duct. Alternatively the feed duct can be moved away from fixed rollers.

Claims

1. Apparatus for open-end spinning of yarn, comprising first and second bodies of rotation (1, 2) each defining a surface and arranged such that in an operating position the surfaces are closely adjacent at a line of closest approach so as to define between them at that line a yarn formation area; a fibre feed duct (8) for feeding an airborne stream of fibres into the yarn formation area which feed duct terminates in the operating position closely adjacent the surfaces; means (14, 15, 19) mounting at least one of the first and second bodies (1, 2) and the feed duct (8) such that at least one of the first (1) and second (2) bodies is movable relative to the other(s) away from and back to the operating position in a direction generally parallel to the plane including the said line of closest approach and the direction of movement of the fibres along the feed duct (8); and means for stopping the feed of fibres; characterised by the fact that the mounting of said at least one of the first and second bodies includes a pivot (18) at or adjacent one end of the body (1) for relative pivoting movement away from the operating position about a pivot axis transverse to the line of closest approach to increase the spacing of said at least one of the first (1) and second (2) bodies from the other(s) of the first and second bodies and the feed duct, and the movement back to the operating position decreases the spacing; and in that stop means (19, 14) are provided for defining the operating position such that the return to the operating position is made without the need for resetting the said spacing.

2. Apparatus according to claim 1, including a framework (19), and means mounting the feed duct in stationary position relative to the framework, characterised by means mounting one (1) of the bodies for pivotal movement relative to the framework (19) and the feed duct (8).

3. Apparatus according to claim 2, characterised by means mounting the other (2) of the bodies in stationary position relative to the framework (19).

4. Apparatus according to any preceding claim, wherein the bodies (1, 2) are cylindrical and rotatable about parallel axes, characterised in that said relative movement is perpendicular to the plane including the axes of rotation of the bodies.

5. Apparatus according to any preceding claim, wherein at least one (2) of the bodies is perforated and the means for feeding the airborne stream of fibres along the feed duct

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includes suction means for developing an airstream through the perforated body, characterised in that the means for stopping the feed of the fibres includes means for temporarily halting the suction-induced airstream through the perforated body.

6. A method of cleaning following a yarn break in an apparatus for open-end spinning of yarn of the type comprising first and second bodies of rotation (1, 2) each defining a surface and arranged such that in an operating position the surfaces are closely adjacent at a line of closest approach so as to define between them at that line a yarn formation area, suction means (24, 25) for developing an airstream through at least one of the surfaces of the yarn formation area, and a fibre feed duct (8) for feeding fibres into the yarn formation area which feed duct terminates in the operating position closely adjacent the surfaces, the method including the steps of temporarily halting the airstream through the surface and of causing movement between at least one (1) of the first (1) and second (2) bodies relative to the other(s) of the first and second bodies and the feed duct (8) in a direction parallel to the plane which includes the line of closest approach and the direction of fibre feed, characterised in that said relative movement is pivotal movement about an axis which is transverse to the line of closest approach and at or adjacent one end of the pivotally mounted said body so as to increase the spacing of the at least one (1) of the first (1) and second (2) bodies relative to the other(s) of the first and second bodies and the feed duct.

7. A method according to claim 6, wherein the yarn formation area is elongate characterised in that the airstream through the surface is gradually closed off from one end of the area toward the opposite end whereby to move any fibres remaining in the area toward the opposite end for ejection from the area.

Patentansprüche

1. Vorrichtung zum Offenend-Spinnen von Garnen, mit ersten und zweiten Rotationskörpern (1, 2), von denen jeder eine Oberfläche aufweist und die derart angeordnet sind, daß in einer Betriebsstellung die Oberflächen längs einer Linie größter Annäherung unter Ausbildung eines bei dieser Linie befindlichen Garnbildungsbereiches nahe beieinanderliegen; mit einem Faserspeisekanal (8) zum Einspeisen eines in Luft mitgeführten Faserstromes in den Garnbildungsbereich, wobei der Faserspeisekanal in der Betriebsstellung nahe der Oberflächen mündet; mit Einrichtungen (14, 15, 19), um wenigstens einen der ersten und zweiten Körper (1, 2) und den Speisekanal (8) derart zu lagern, daß wenigstens einer der ersten (1) und zweiten (2) Körper bezüglich des bzw. der jeweils anderen von der Betriebsstellung weg und in diese zurück in einer Richtung bewegbar ist, die

im wesentlichen parallel zu der die Linie größter Annäherung und die Bewegungsrichtung der Fasern längs des Speisekanals (8) enthaltenden Ebene verläuft; sowie mit Mitteln zum Unterbrechen der Faserzufuhr, dadurch gekennzeichnet, daß die Lagerung des wenigstens einen der ersten und zweiten Körper einen an oder nahe an einem Ende des Körpers (1) angeordneten Schwenkzapfen (18) aufweist, der eine von der Betriebsstellung weggerichtete relative Schwenkbewegung um eine quer zu der Linie größter Annäherung verlaufende Schwenkachse erlaubt, um damit den Abstand des wenigstens einen der ersten (1) und zweiten (2) Körper von dem bzw. den anderen ersten und zweiten Körper(n) und dem Speisekanal zu vergrößern, während die Rückbewegung in die Betriebsstellung den Abstand verringert, und daß Anschlagmittel (19, 14) vorgesehen sind, durch die die Betriebsstellung derart festgelegt ist, daß die Rückführung in die Betriebsstellung ohne Notwendigkeit einer Nachstellung dieses Abstandes ermöglicht ist.

2. Vorrichtung nach Anspruch 1, mit einem Rahmengestell (19) und mit einer Einrichtung, um den Speisekanal in einer ortsfesten Stellung bezüglich des Rahmengestells zu halten, gekennzeichnet durch eine Lagereinrichtung, mit der einer (1) der Körper bezüglich des Rahmengestells (19) und des Speisekanals (8) schwenkbar gelagert ist.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß sie eine Einrichtung aufweist, um den anderen (2) der Körper in einer ortsfesten Stellung bezüglich des Rahmengestells (19) zu lagern.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der die Körper (1, 2) zylindrisch und um parallele Achsen drehbar sind, dadurch gekennzeichnet, daß die Relativbewegung rechtwinklig zu der die Drehachsen der Körper enthaltenden Ebene gerichtet ist.

5. Vorrichtung nach einem der vorhergehenden Ansprüche, bei der wenigstens einer (2) der Körper perforiert ist und die Mittel zum Zuspiesen des in der Luft mitgeführten Faserstromes längs des Speisekanals Saugzugmittel umfassen, die einen Luftstrom durch den perforierten Körper erzeugen, dadurch gekennzeichnet, daß die Mittel zum Unterbrechen der Faserzufuhr eine Einrichtung aufweisen, um den durch Saugzug erzeugten Luftstrom durch den perforierten Körper vorübergehend zu unterbrechen.

6. Verfahren zum Reinigen nach einem Garnbruch bei einer Vorrichtung zum Offenend-Spinnen von Garn mit ersten und zweiten Rotationskörpern (1, 2), von denen jeder eine Oberfläche aufweist und die derart angeordnet sind, daß in einer Betriebsstellung die Oberflächen längs einer Linie größter Annäherung unter Ausbildung eines bei dieser Linie befindlichen Garnbildungsbereiches nahe beieinanderliegen, mit Saugzugmitteln (24, 25), um einen Luftstrom durch wenigstens eine der

Oberflächen des Garnbildungsbereiches zu erzeugen, sowie mit einem Faserspisekanal (8) zum Einspeisen von Fasern in den Garnbildungsbereich, wobei der Speisekanal in der Betriebsstellung nahe der Oberflächen mündet (und) wobei das Verfahren die Verfahrensschritte aufweist, daß zeitweise der Luftstrom durch die Oberfläche unterbrochen und eine Bewegung zwischen wenigstens einem (1) der ersten (1) und zweiten (2) Körper relativ zu dem bzw. den jeweils anderen ersten und zweiten Körper(n) und dem Speisekanal (8) in einer Richtung erzeugt wird, die parallel zu der die Linie größter Annäherung und die Richtung der Fasereinspeisung enthaltenden Ebene verläuft, dadurch gekennzeichnet, daß die Relativbewegung eine Schwenkbewegung um eine Achse ist, die quer zu der Linie größter Annäherung verläuft und an dem oder nahe einem Ende des schwenkbar gelagerten Körpers liegt, derart, daß der Abstand des wenigstens einen (1) der ersten (1) und zweiten (2) Körper bezüglich des bzw. der jeweils anderen ersten oder zweiten Körper und dem Speisekanal vergrößert wird.

7. Verfahren nach Anspruch 6, bei dem der Garnbildungsbereich länglich ist, dadurch gekennzeichnet, daß der Luftstrom durch die Oberfläche von einem Ende des Bereiches zu dessen gegenüberliegendem Ende hin fortschreitend unterbrochen wird, derart, daß in dem Bereich zurückbleibende Fasern zu dem andern Ende hin bewegt werden, um aus dem Bereich ausgeworfen zu werden.

Revendications

1. Dispositif pour le filage de fil suivant la principe open-end, comprenant un premier et un second corps rotatifs (1, 2) délimitant chacun une surface et disposés de sorte que dans une position de fonctionnement les surfaces sont étroitement adjacentes à une ligne d'approche la plus rapprochée de façon à délimiter entre elles, au niveau de cette ligne, une aire de formation de fil; une conduite d'alimentation de fibres (8) pour fournir un courant de fibres aéroportées dans l'air de formation du fil que la conduite d'alimentation limite dans la position de fonctionnement étroitement adjacente aux surfaces; des moyens (14, 15, 19) supportant au moins l'un des premier et second corps (1, 2) et la conduite d'alimentation (8), de sorte qu'au moins l'un des premier (1) et second (2) corps soit mobile l'un par rapport à l'autre ou aux autres en s'éloignant de et en revenant à la position de fonctionnement dans une direction à peu près parallèle au plan contenant ladite ligne d'approche la plus rapprochée et la direction du mouvement des fibres le long de la conduite d'alimentation (8); et des moyens d'arrêt de l'alimentation en fibres; caractérisé en ce que les moyens de support dudit au moins un des

premier et second corps, comprennent un pivot (18) disposé sur ou adjacent à une extrémité du corps (1) pour permettre un mouvement de pivotement relatif en direction opposée de la position de fonctionnement autour d'un axe de pivotement transversal à la ligne d'approche la plus rapprochée afin d'accroître l'écartement entre ledit au moins un des premier (1) et second (2) corps, et le ou chaque autre parmi les premier et deuxième corps ainsi que la conduite d'alimentation, le mouvement de retour vers la position de fonctionnement diminuant l'écartement; et en ce qu'il est prévu des moyens d'arrêt (19, 14) pour délimiter la position de fonctionnement de telle façon que le retour à la position de fonctionnement soit effectué sans avoir besoin de réajuster ledit écartement.

2. Dispositif selon la revendication 1, comportant un bâti (19) et des moyens supportant la conduite d'alimentation en position immobile par rapport au bâti, caractérisé en ce qu'il est prévu des moyens de support de l'un (1) des corps pour permettre un mouvement de pivotement par rapport au bâti (19) et à la conduite d'alimentation (8).

3. Dispositif selon la revendication 2, caractérisé par des moyens supportant l'autre (2) des corps en position immobile par rapport au bâti (19).

4. Dispositif selon l'une des revendications précédentes, dans lequel les corps (1, 2) sont cylindriques et tournent autour d'axes parallèles, caractérisé en ce que ledit mouvement relatif est perpendiculaire au plan contenant les axes de rotation des corps.

5. Dispositif selon l'une des revendications précédentes, dans lequel au moins l'un (2) des corps est perforé et dans lequel les moyens pour fournir le courant de fibres aéroportées le long de la conduite d'alimentation comporte des moyens d'aspiration pour créer un courant d'air à travers le corps perforé, caractérisé en ce que les moyens d'arrêt de l'alimentation en fibres comportent des moyens pour arrêter temporairement le courant d'air d'aspiration créé à travers le corps perforé.

6. Procédé de nettoyage après une rupture de fil dans un dispositif de filage de fil suivant le principe open-end du type comprenant un premier et un second corps rotatifs (1, 2) délimitant chacun une surface et disposés de sorte qu'en position de fonctionnement les surfaces soient étroitement adjacentes à une ligne d'approche la plus rapprochée de façon à délimiter entre elles au niveau de cette ligne, une aire de formation du fil, des moyens d'aspiration (24, 25) pour créer un courant d'air à travers au moins l'une des surfaces au niveau de l'aire de formation du fil, et une conduite (8) d'alimentation en fibres pour fournir des fibres dans l'air de formation du fil, que la conduite d'alimentation limite dans la position de fonctionnement étroitement adjacente aux surfaces, le procédé comprenant les étapes consistant à arrêter momentanément le courant

d'air à travers la surface et à provoquer un mouvement entre au moins l'un (1) parmi le premier (1) et le second (2) corps, par rapport à l'autre ou aux autres parmi les premier et second corps ainsi que la conduite d'alimentation (8) dans une direction parallèle au plan qui contient la ligne d'approche la plus rapprochée et la direction d'alimentation en fibres, caractérisé en ce que ledit mouvement relatif est un mouvement de pivotement autour d'un axe qui est transversal à la ligne d'approche la plus proche et situé sur ou adjacent à une extrémité dudit corps monté pivotant de façon à accroître l'écartement dudit au moins un (1) des premier (1) et second (2) corps par rapport à l'autre ou chaque autre parmi les premier et second corps ainsi que la conduite d'alimentation.

7. Procédé selon la revendication 6, dans lequel l'aire de formation du fil est allongée, caractérisé en ce que le courant d'air à travers la surface est graduellement fermé à partir d'une extrémité de l'aire vers l'extrémité opposée pour déplacer vers l'extrémité opposée toute fibre restant dans l'aire pour l'éjecter de l'aire.

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FIG.1.

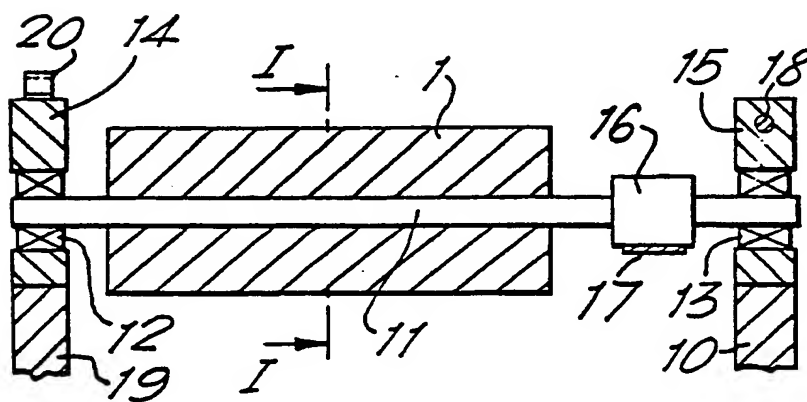
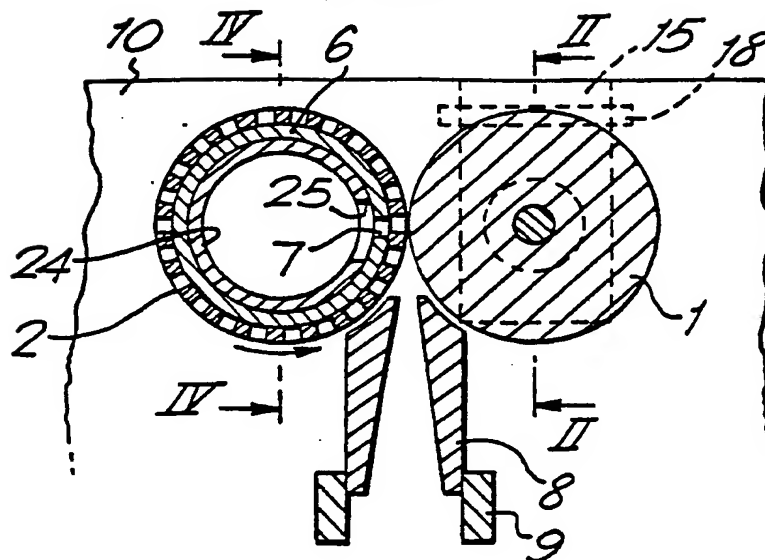


FIG.2.

FIG.3.

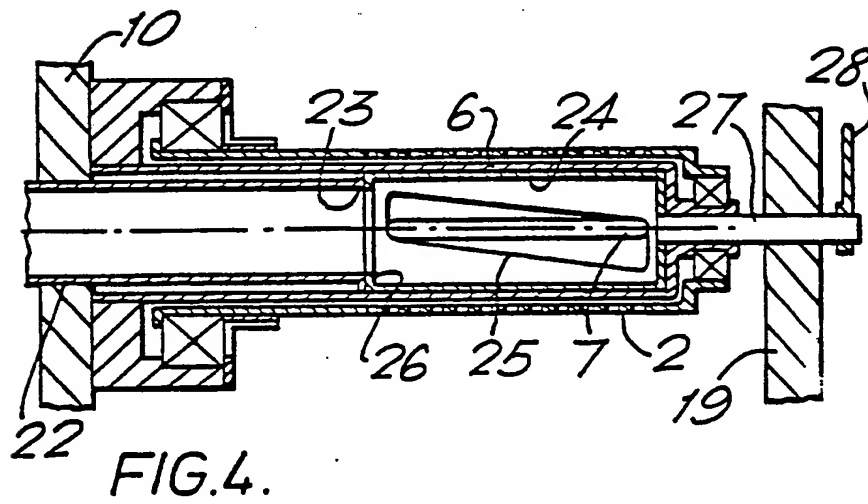
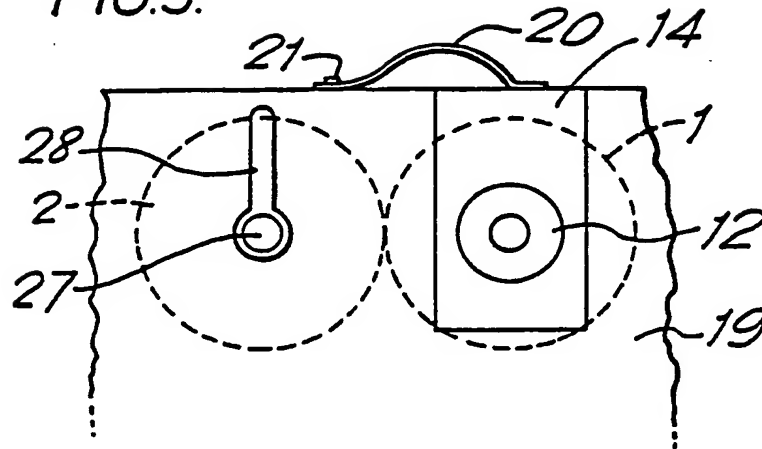


FIG.4.

FIG.5.

